

I CLAIM:

1. A condenser microphone comprising:

a condenser housing defining an inner space therein; and

5 a variable gap condenser enclosed in said inner space in said condenser housing and including an insulating substrate,

a conductive fixed back plate mounted securely on said insulating substrate,

10 a diaphragm unit spaced apart from said back plate and aligned with and movable relative to said back plate in a first transverse direction relative to said back plate, and

a spacer unit interposed between and in
15 contact with said back plate and said diaphragm unit so as to support said diaphragm unit on said back plate and so as to define a variable gap thereamong, said spacer unit defining at least a first air passage that extends in a second transverse
20 direction relative to said first transverse direction and that is disposed between and in spatial communication with said inner space and said variable gap.

2. The condenser microphone of Claim 1, wherein said
25 spacer unit includes a plurality of spaced apart spacer blocks around said variable gap and defines a plurality of said first air passages, each of which

is defined by two adjacent ones of said spacer blocks.

3. The condenser microphone of Claim 2, wherein said diaphragm unit has a central portion confining a top side of said variable gap, and a plurality of fins disposed around and extending outwardly from a periphery of said central portion and connected respectively to said spacer blocks, said diaphragm unit defining a plurality of second air passages, each of which is defined by two adjacent ones of said fins and each of which is in spatial communication with said inner space and said variable gap.
4. The condenser microphone of Claim 1, wherein said diaphragm unit includes a compliant layer formed on said spacer unit, and a conductive film formed on said compliant layer and defining an electrode of said variable gap condenser.
5. The condenser microphone of Claim 4, further comprising a field effect transistor mounted on said insulating substrate and connected electrically to said electrode.
6. The condenser microphone of Claim 1, further comprising an electret formed on said back plate and disposed between said back plate and said spacer unit.
7. The condenser microphone of Claim 1, wherein said condenser housing has a bottom wall, a peripheral

wall extending upwardly from said bottom wall and spaced apart from said variable gap condenser, and a top wall opposite to said bottom wall and extending laterally from said peripheral wall, said

5 insulating substrate being mounted on said bottom wall of said condenser housing, said top wall being spaced apart from said diaphragm unit and being formed with a top opening that is aligned with said diaphragm unit, said condenser housing further
10 having a cover that covers said top opening in said top wall and that permits transmission of sound waves therethrough.

8. A method for making a condenser microphone, comprising the steps of:

- 15 (a) preparing an insulating substrate;
- (b) forming a conductive back plate on said insulating substrate;
- (c) forming a spacer unit and a sacrificial layer on said back plate in such a manner that said spacer
20 unit is divided by said sacrificial layer into a plurality of spacer blocks;
- (d) forming a compliant layer on said spacer unit and said sacrificial layer;
- (e) forming a conductive film on said compliant
25 layer, said conductive film and said compliant layer cooperatively defining a diaphragm unit that is movable relative to said back plate;

(f) removing said sacrificial layer from said back plate so as to form a plurality of air passages, each of which is defined by two adjacent ones of said spacer blocks, and so as to form a variable gap disposed between said compliant layer and said back plate and surrounded by said spacer blocks; and

(g) mounting the assembly of said insulating substrate, said back plate, said spacer unit, and said diaphragm unit in a condenser housing in such a manner that said air passages are in spatial communication with an inner space defined by said condenser housing.

9. The method of Claim 8, further comprising forming a field effect transistor on said insulating substrate prior to the formation of said back plate.